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Effective Writing Interventions for Students with Learning Disabilities

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Effective Writing Interventions for Students with Learning Disabilities

by

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Chapter 1: Introduction

Writing is one of the most important tools for learning and showing what someone has learned (Harris & Graham, 2013). It requires the ability to plan, produce text, revise, and self-motivate (Santangelo, 2014) which can be a difficult academic skill for many students. It is even more difficult for students with a learning disability (LD) who have executive functioning deficits that affect how they “receive, store, process, retrieve, express, or manipulate information” (Cortielle & Horowitz, 2014, p. 3). Executive functioning helps people manage time, pay attention, switch focus, plan and organize, remember details, and do things based upon personal experiences (Bhandari, 2015). Poor executive functioning skills make it difficult to plan how much time should be dedicated to the writing process, plan ideas during prewriting, organize topics within the paper, and use memory to relate text-to-self ideas.

Kavale and Forness (1995) estimated that two in five students with LD have individualized education plan (IEP) goals in the area of writing, which may be related in part to their difficulties in reading. Students with LD tend to rely on generating ideas rather than planning, organizing, or reviewing what they are writing. To overcome these deficits and become more successful writers, they must be taught specific steps of the writing process. The purpose of this paper was to determine the impact of systematic writing interventions on the quality of writing produced by students with LD.

History of Learning Disabilities

The term *learning disability* was first used in 1962 by Samuel Kirk to describe students with perceptual problems and speech and language problems (Bender, 1992). Passage of the Education of All Handicapped Children Act of 1975 (PL 94-142) ensured that, for the first time,

all students with disabilities must be provided free and appropriate public education (U.S. Department of Education, 2010). Cortiella and Horowitz (2014) described how this legislation provided children with the right to a timely and comprehensive evaluation and provided parents and guardians with the right to be a full and equal participant in planning their child's education. The 1975 landmark legislation incorporated Samuel Kirk's definition of LD, a definition that has remained unchanged with subsequent reauthorizations. The legislation defined a specific learning disability as:

a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken, or written, which disorder may manifest itself in an imperfect ability to listen, think, speak, write, spell, or do mathematical calculations. Disorders included—such term includes such conditions as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia. Disorders not included—such term does not include a learning problem that is primarily the result of visual, hearing, or motor disabilities, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage. (U.S. Department of Education, 2004)

PL 94-142 used a discrepancy criterion to identify students with LD, which refers to a severe gap between ability and achievement (Kavale, Spaulding, & Beam, 2009). Kavale et al. described discrepancy as the difference between expected and actual achievement. According to Oakes (2011), under this approach a student's IQ is assessed, usually through the use of a version of the *Wechsler Intelligence Scales for Children* (Oakes, 2011). Student achievement in reading, mathematics, and written language is also assessed, most often with the *Woodcock-Johnson Tests of Academic Achievement*. To be eligible for learning disability services, a student must have a severe discrepancy between ability and achievement scores

The numbers of students identified with LD began to soar from 1976 to 1977 and 1989 to 1990 (Hallahan, 1992). Hallahan attributed this growth in part to the misdiagnosis of students

with LD. The 2004 reauthorization of PL 94-142, the Individuals with Disabilities Education Improvement Act (IDEA 2004), provided a 3-tiered model called Response to Intervention, an alternative to identifying learning disabilities instead of using the discrepancy (RTI; U.S. Department of Education, 2006). Hughes and Dexter (2011) described these three tiers.

1. Tier 1 involves universal screening of all students in math, writing, and/or reading three times a year. Students who do poorly on the screenings are placed into the *at-risk* category, and progress monitoring is used.
2. If students do not respond to Tier 1 interventions, they are referred for Tier 2 interventions that are more targeted. These focused interventions may include curriculum-based measurement, strategy instruction, and other interventions.
3. When a student fails to respond to Tier 2 interventions, he or she is referred to Tier 3 interventions. These interventions are designed for the 2-7% of students who do not respond to Tier 2 interventions (Hughes & Dexter, 2011). Students in Tier 3 are often referred for special education services.

Although current data report that LD is still the largest special education category serving 42% of all special education students, the numbers began to decrease by 2% each year since 2002 (Cortielle & Horowitz, 2014). This decline may be related to the new RTI identification process that provides screening and at-risk interventions prior to special education identification (Kavale et al., 2009). In the next section, I discuss the writing deficits of students who require more targeted interventions.

Learning Disabilities and Writing Deficits

Harris and Graham (2013) reported that “writing is one of the most difficult academic areas for students to master” (p. 66). Dysgraphia is the term associated with a specific learning disability in writing. Cortielle and Horowitz (2014) described characteristics of dysgraphia as

a tight, awkward pencil grip and body position, tiring quickly while writing, avoiding writing or drawing tasks, trouble forming letter shapes as well as inconsistent spacing between letters or words, difficulty writing or drawing on a line or within margins, trouble organizing thoughts on paper, trouble keeping track of thoughts already written down, difficulty with syntax structure and grammar, large gap between written ideas and understanding demonstrated through speech. (p. 4)

When students are challenged by the physical mechanics of writing, they are unlikely to devote time to the writing process itself, which is also overwhelming for many students with LD. They may put forth insignificant effort or avoid writing altogether whenever possible (Garcia-Sanchez & Fidalgo-Redondo, 2006). Even when writing mechanics improve, students with LD have difficulty putting their thoughts in writing.

Students with writing deficits act as if writing is a single process to generate text versus thinking about all the different steps it takes to make an organized and coherent document (Gillespie & Graham, 2014). The writing process requires planning, text production, revision/editing, and motivation or goal setting, and many of these process rely on working memory (Harris & Graham, 2013; Santangelo, 2014).

Planning. Harris, Graham, and Mason (2003) reported that planning is a challenge for students with LD to retrieve relevant information from their memory (as cited in Santangelo, 2014). Students with LD are often confronted with planning difficulties due to their memory deficits. Planning requires writers to organize what they are going to say and think about how

they are going to say it (Harris & Graham, 2013). Students with LD have difficulty doing both of these simultaneously.

Montague and Leavell (1994) described how students with disabilities typically have limited prior knowledge of topics, which makes it difficult to plan what to write. Their minimal ability to remember specific details when planning causes problems during the writing process. Montague and Leavell also reported that students with LD create incomplete, disorganized stories, which makes planning how to organize their topics in a written document a difficult task to complete independently.

When students are planning, they typically write a story from memory that they think is somewhat similar to the topic at hand (Graham, Harris, & Larson, 2001). This means that students with LD cannot plan on how to write the information that is needed in their paper, so they write about a topic that does not relate to the topic at hand.

Text production. Another area in which memory deficits create struggles for students with learning disabilities is their ability to produce text. Santangelo (2014) described text production as a task that “requires writers to generate their ideas into words, sentences, and larger discourse units within their working memory. Then, the writer must transcribe that message into written text” (p. 10). Students with LD have difficulty with this because when they are writing, they are thinking about spelling, handwriting, and grammar. Thus, they use more time and energy when writing, which can be tiring. When students are fatigued, they have less time to think about ideas and creating fluent writing passages (Gillespie & Graham, 2014).

Text revision/editing. Students without disabilities devote the most time to this area of writing, whereas students with LD allocate the least amount of time revising their papers (García

& Fidalgo, 2008). Students with LD approach revision as only proofreading and fixing grammatical errors (Gillespie & Graham, 2014). They spend more time editing, which involves focusing on spelling, capitalization, and punctuation errors versus revising. Revising focuses on word substitution, paying attention to tone, rearranging text, or thinking about the purpose of the audience to make it sound better (García & Fidalgo, 2008). Graham and Weintraub (1996) observed that students with LD typically have less legible handwriting, which creates problems when revising because they cannot read their own handwriting (as cited in García & Fidalgo, 2008).

Motivation. The ability to motivate oneself is difficult for students with a learning disability (Santangelo, 2014). Unlike students without LD who understand the value of learning how to write and the benefits of learning to be a successful writer, students with LD have less knowledge about the purpose and value of writing (Saddler & Graham, 2007; Santangelo, 2014). Students with LD are not motivated because of their negative beliefs about their own writing abilities; they know they are not proficient at it, so they do not desire to do so (Gillespie & Graham, 2014). This attitude toward writing deteriorates as the student progresses in school because of their past difficulties (Harris & Graham, 2013).

Summary. Students who write effectively must be able to use these multiple skills in an integrated fashion, which presents challenges for students with LD (García & Fidalgo, 2008; Gillespie & Graham, 2014). Memory difficulties make it hard for students to remember all of the steps in the writing process while making sure they have spelled words correctly, used correct grammar, organized their topics, and produced text that makes sense to the reader.

Research Questions

One research question was addressed in this review of literature: Which interventions are most effective for improving the quality of writing produced by students with learning disabilities?

Focus of Paper

The studies used for this literature review were published from 2005 to 2015. Quantitative research designs were studied with participants ranging from middle to high school, or more specifically grades 5 through 12. These students also had to be identified as having a learning disability. All studies used for this review were conducted in the United States.

The Academic Search Premier and PsycINFO databases were used to locate journal articles for this literature review. Several keywords and combinations of keywords were used for searching the databases: *learning disabilities*, *writing interventions*, *expressive writing*, *narrative writing*, *writing strategies*, and *language arts*. With these search terms, 11 articles were selected from the last 10 years from a number of journals, including *Learning Disabilities: A Contemporary Journal*, *Learning Disabilities Research and Practice*, *Learning Disabilities Quarterly*, *Educational Research Quarterly*, *Behavior Disorders*, *Language Speech & Hearing Services in Schools*, *Annals of Dyslexia*, and *Exceptional Children*.

Importance of the Topic

Students identified as having a learning disability typically struggle with written expression, especially if their disability is related to reading or writing. Finding interventions that will improve their writing is of high importance to me. As a teacher of students with LD, I have had students shut down and cry because of their severe writing difficulties. It breaks my

heart to see them so upset because of the stress and struggles they have related to writing. This typically causes disengagement from any activity that involves writing.

I have observed that almost all of the students in my resource setting experience writing difficulties—even those without a specific learning disability related to reading or writing. These students have difficulty forming ideas during pre-writing, putting their thoughts on paper, revising, editing, and finalizing their work. I reviewed the literature related to writing interventions that have a strong evidence base so that I can implement them to help my students. Hopefully, improved writing skills will boost students' confidence and perhaps even help them develop a passion for the writing process.

Definition of Terms

The following definitions clarify terminology used throughout the paper, although definitions are not presented for terms already defined.

6-trait model of writing: model used to score writing where points are given for each of the six traits including ideas, organization, voice, word choice, sentence fluency, and conventions into a total score (Bulgren, Marquis, Lenz, Schumaker, & Deshler, 2009).

Cognitive strategies: a mental process or procedure for accomplishing a particular cognitive goal that influence how students will perform in school as applied in many different situations (Chinn & Chinn, 2009).

Direct instruction: research-validated method of instruction that includes fast-paced, well-sequenced, highly focused lessons for students in small groups that need immediate feedback (Walker, Shippen, Alberto, Houchins, & Cihak, 2005).

Effect size: numerical way of expressing the strength or magnitude of a reported relationship (Gay, Mills, & Airasian, 2006).

Executive functioning: a set of processes that all have to do with managing oneself and one's resources in order to achieve a goal. It is an umbrella term for “the neurologically based skills involving mental control and self-regulation” (Cooper-Kahn & Dietzel, 2009, p. 9).

Inclusion model: when students with disabilities take classes with their non-disabled peers in the general education classroom (Ferretti, Lewis, & Andrews-Weckerly, 2009).

Individual Education Plan (IEP): a legal document created by a team consisting of a student, parents, general education teacher, special education teacher, and school representative used to describe the plan that will be incorporated into the students education with regards to present levels, goals, accommodations/modifications, and transition after high school (once in 9th grade or 14 years old).

Learning disability: a neurological condition that interferes with an individual’s ability to store, process, or produce information. Learning disabilities can affect one’s ability to read, write, speak, spell, compute math, reason and also affect an individual’s attention, memory, coordination, social skills and emotional maturity (Learning Disabilities Association of America, 2015).

Metacognitive process: awareness of one’s own knowledge, or “thinking about thinking.” Understanding what one knows and does not know; with the ability to understand, control, and manipulate the cognitive process (Teaching Excellence in Adult Literacy, 2012).

Morphological awareness: recognition, understanding, and use of word parts that carry significance like root words, prefixes, suffixes, and grammatical inflections; understanding that they can be taken away or added to change a word's meaning (University of Michigan, 2016).

Oral and written language learning disability (OWL LD): individuals who do not struggle with any primary language disability but are significantly below in morphological skills, syntax, nonverbal reasoning. People also have selective receptive and expressive language difficulties and often go undetected by school professionals (Red Ladder Optimized Learning, 2016).

Orthographical awareness: knowledge or awareness consisting of spelling, contractions, punctuation, and capitalization when writing or reading as stored in the memory as rules (Luke Waites Center for Dyslexia and Learning Disorders, 2014).

Phonological awareness: understanding sounds in language, rhymes, syllables, and being able to understand the relationship between written and spoken language (Phonological Awareness, 2013).

Procedural knowledge: knowledge on how to do something (Theory of Knowledge, 2015).

Semantic knowledge: common knowledge, such as names of colors (Zimmermann, 2014). The meanings attached to words and sentences (Hallahan, Kauffman, & Pullen, 2009). It is independent of personal experiences.

Semantic webbing: graphical representation of students' knowledge and perspectives about key themes to use when writing (Maddux, Johnson, & Willis, 1997).

Syntax: the way words are joined together to structure meaningful sentences; grammar (Hallahan et al., 2009).

Writing process: the process or stages of creating written works through specific steps of pre-writing, drafting and writing, sharing and responding, revising and editing, and publishing (Kamehameha Schools, 2007).

Working memory: the ability to hold on to information both auditorily and visually long enough to be able to use it. Working memory is related to accessing information, remembering instructions, paying attention, learning to read, and learning math (Morin, 2013).

Chapter 2: Review of Literature

The information presented in Chapter 1 described the writing deficits of students with learning disabilities (LD). In this chapter, I present the findings of 11 studies that evaluated the impact of interventions designed to improve the quality of writing for students with LD. Studies are presented in ascending chronological order.

Writing Intervention Research

Chalk, Hagan-Burke, and Burke (2005) completed a study to determine if the *Self-Regulated Strategy Development Model* (SRSD) was effective in improving the writing of students with a learning disability in written expression. The 11 males and four females in this case study were 10th graders at a large suburban school in the southeastern U.S. Students were in a special education resource setting for at least three academic classes, and the others were in the general education setting.

The SRSD strategy includes eight steps: baseline, pre-skill instruction, modeling, controlled practice, independent practice, post-instruction, maintenance, and generalization. The classroom teacher conducted five, 20-25 min sessions during a 50-min instructional period. Writing prompts were randomly assigned throughout the study as probes. The topic was read to students, questions were answered, and directions were given (feedback or assistance was not provided). Verbal feedback included only redirection to the task and praise. The students had 15 min to write their essays and were given a warning when 1 min was left. Scoring was based on length and quality; any word was counted, even if spelled incorrectly. Each essay was scored twice: once by the teacher and the second time by a language arts teacher. Two trained teachers

scored quality of writing using the school district's writing rubric that assessed focus development, organization, fluency, and conventions on a 6-point scale.

Descriptive statistics and ANOVAs were used to analyze data. A significant trend was observed between conditions and number of words written ($F_{(1, 14)} = 164, p = .000$), and time accounted for 92% of the variance. Intervention, maintenance, and generalization were significant when compared to baseline.

Overall, the SRSD model helped students with LD improve their writing by developing strategies for brainstorming, semantic webbing, goal setting, and revising. This also increased the word production and quality of essays. The lack of a control group and a convenience sampling were limitations, as well as the reliance upon student graphing of data. Overall, the findings produced positive improvements for students with LD, but more research on the SRDS method should be continued.

Bui, Schumaker, and Deshler (2006) evaluated the effects of the *Demand Writing Instruction Model* (DWIM), a writing program they created for students with and without LD in inclusive general education settings. Participants included 14 students with LD in writing from five classrooms in two public elementary students in the midwest. Three classrooms were assigned to the experimental condition: two classes from School X and one from School Y. Two classes from School Y were assigned to the comparison condition. Overall, participants included nine students with LD and 58 students without disabilities in the experimental condition ($n = 67$) and five students with LD and 41 students without disabilities in the comparison condition ($n = 46$).

The DWIM targeted two domains of writing: semantic knowledge and procedural knowledge using thirty 45- to 60-min lessons over a 3-month period. Experimental group participants received instruction in six traits of writing; use of a planning sheet; narrative text structure; sentence, paragraph, and theme writing; and error monitoring. Pre- and posttest writing samples were collected using two test forms (Test A and Test B). Writing samples were also collected from the participants 1 week after instruction. The writing prompts for Test A were “A Time I Got Hurt” and “The Special Gift,” whereas Test B prompts were “A Happy Event” and “The Time I Lost Something Important.” Pre- and posttest data included a sentence writing score, paragraph writing score, theme writing score, text-structure score, planning-time score, essay length score, knowledge of the writing process score, and the state writing assessment score (used after 1 week of completion of intervention). Teachers and parents also completed satisfaction surveys. Results were analyzed using ANOVAs and descriptive data.

The DWIM intervention resulted in significant positive gains for students with LD in the experimental group on 8 of 10 measures: complete sentences, complicated sentence, paragraph writing, and theme writing scores, planning time, text-structure scores, student self-efficacy ratings, and teacher ratings. Effect sizes were large across these eight measures and ranged from .46 to .8. Experimental students without LD had higher mean posttest scores than the experimental students with LD, but no interaction effect was reported between the two groups. This means that the intervention had the same effect on both students with and without LD. No statistically significant differences were reported on the statewide assessment scores between experimental and control groups as a whole. Bui et al. (2006) speculated that these results may be due to the short duration of the intervention and also because both groups received instruction on the six traits of

writing, upon which the state assessment was based. Table 1 presents a summary of the study's findings.

Table 1

Experimental and Comparison Group Outcomes

	LD EXPERIMENTAL	LD COMPARISON	NON-LD EXPERIMENTAL	NON-LD COMPARISON
Sentence Writing	Nonsignificant	Nonsignificant	Nonsignificant	Nonsignificant
Complete Sentences	Significant: large effect size (80% gain)	Score decrease in mean scores	Significant: large effect size (61% gain)	Nonsignificant
Theme Writing	Significant: large effect (58% gain)	Score decrease in mean scores	Significant: large effect (74% gain)	Significant: medium effect (11% gain)
Essay Length	Nonsignificant: small effect (5% gain)	Score decrease in mean scores	Significant: Mean gain of 27 words	Nonsignificant (decrease by 18.39 word)
Text-Structure	Significant: large effect (45% gain)	Small mean gains (4.6 to 5.2 elements)	Significant: large effect (62% gain)	Significant: medium effect (10% gain)
Planning Time	Significant: large effect (71% gain) 8.77 min	Small mean gain (0 to 2.4 minutes)	Significant: large effect (76% gain) 10.1 min	Significant: medium effect (12 % gain) 1.51-min gain
Knowledge of writing process	Nonsignificant	Score decrease in mean scores	Significant: large effect (30% gain)	Significant: (26% loss) decrease .92 points
Self-efficacy	Significant: large effect (49% gain)	Mean gain of 3.2 points	Significant: small effect (4% gain)	Nonsignificant: mean gain of 1.2 points
Complicated sentence writing score	Significant: large effect (71% gain)	No gains	Significant: large effect (51% gain)	Nonsignificant
Paragraph writing score	Significant: large effect size (71% gain)	Nonsignificant	Significant: large effect (60% gain)	Nonsignificant
State writing assessment score	Mean score 2.15 (unsatisfactory level/ not passing)	Mean score of 2.1(unsatisfactory level/ not passing)	Mean score 3.1 (satisfactory level/passing)	Mean score 2.8 (basic level/not passing)

Surveys were used to collect satisfactions ratings from parents and guardians. The parents and guardians for the students in the experimental group also were sent home a sample of their student's work throughout instruction and at the end. The survey contained eight statements related to the performance and outcome of the student's paper. The parent/guardian

responses were collected by using a 7-point Likert-type scale, with a 7 representing *highly agree* and a 1 representing *highly disagree*. Teachers also used the same scale to gather information to see if they would use the intervention in the future with other classes. Parents and guardians with students in the experimental group were very satisfied with the DWIM. The mean was close to 6 points. Parents felt more teachers should use the intervention, and that they would recommend the program to other parents. The teachers' mean overall was 6.7, and they were extremely satisfied with the DWIM. Teachers in the comparison group resulted in a .35 rating point increase for students without LD, and students with LD made a mean gain of .6 points.

Bui et al. (2006) noted several limitations with this study: (a) the small number of students with LD, (b) lack of control for school effects, (c) short instructional time, (d) the use of different pre- and posttests, and (e) the use of different instructors. They recommended that more research be conducted during earlier school years and that students with LD be taught in paired or small group settings for individual attention and feedback. They also recommended that more independent practice be provided to ensure mastery of individual skills.

Walker et al. (2005) investigated the effects of the *Expressive Writing* program on the writing skills of high school students with LD. The participants for this study included three students with LD enrolled in a large metropolitan public high school located in the southeastern United States. Kurt, Angellica, and Darren were of average intelligence, ranged in age from 14 to 16 years old, and received at least one 90-min time period in the special education setting per day. The *Expressive Writing I* student book and teacher's edition were used to teach mechanics, sentence writing, paragraph and story writing, and editing. *Expressive Writing* is a program that uses the Direct Instruction scripted method to teach students in small groups.

Students were scored on the correct word sequences (CWS) they could complete on the writing probes. Baseline data were gathered by having participants write for 3 min about topic sentences that were provided. The participants were then assigned to one of three small groups (no more than four students per group) for 50 consecutive days of instruction. Like the baseline condition, students were given topic sentences and only the first 3 min of writing was used in scoring the CWS during the 39 collected probes. Maintenance probes were taken after the intervention was completed at weeks 2, 4, and 6.

Each of the three participants made gains in their writing abilities and maintained the skills up to 6 weeks after the intervention. Kurt's baseline was 35 CWS, which increased to a mean of 42 during the intervention and maintained at an average of 46 CWS. Angellica started with a baseline of 16 CWS, improved to 24 CWS, and maintained at 26 CWS. Darren also increased his CWS from 16 to 26 during intervention and maintained at an average of 31 CWS.

Each student made writing gains from pre- to posttest, as measured by the *Test of Oral Written Language* (TOWL-3; Hammill & Larson, 1996). Pretest scores for Kurt, Angellica, and Darren were 76, 72, and 74, respectively. On the posttest TOWL-3 Kurt received a 79, Angellica received an 81, and Darren received a 79.

According to Walker et al. (2005), these data support the idea that a DI writing approach is an effective method of teaching students with LD. However, their research had limitations. One limitation was the purposeful rather than random assignment of groups; these groups also did not naturally occur in their class schedule. Another limitation was how the topic sentences were given to the participants as they were generated by multiple different resources and not the same resource. The study conducted also had a small number of participants, which is another

limitation. The final limitation to note is that the writing prompts were taken from standardized writing tests instead of content completed in the general education classroom.

Bulgren et al. (2009) used graphic organizers with Question Exploration Routine (QER) in order to increase writing for students identified as LD. Participants included 36 students from a 9-12 grade special education class or general English class from a school located in the midwest. The 36 students were randomly placed in a control group (eight with LD and nine without LD) and an experimental group (10 with LD and nine without LD), with a mean age of 15.95 years and similar IQ scores. The Question Explanation Guide (QEG), the Question Explanation Routine (QER), and a graphic organizer were used as materials for this study. A 30-min film about the ozone layer was also used.

The intervention took place during two 89-min sessions, 5 days apart. Both student groups were together for the first session and asked to take notes during a lecture on the topic. A 30-min, open-note pretest was then administered in which students were to respond to the question, "How do problems with the ozone layer teach us about human effects on our environment?" For the second session the two groups worked separately in similar environmental settings. Each student received 30-min of instruction and told to take notes. Students in the control group watched a film and took notes. A teacher explained how to write a good five-paragraph essay consisting of a topic sentence, three-paragraph body, and a conclusion paragraph. Students had 30 min to respond to the same questions asked during the first session. Essays and notes were collected. Students in the experimental group each received a blank copy of the Guide to use for note taking during the instruction, and taught how the Guide can be used to develop a topic sentence, develop three paragraphs in the body, and write a conclusion. They

also wrote an essay on the same topic and handed in notes along with the essay. Essays were scored using the 6-Trait Model with a rubric to determine if the students could identify the problem, solution, cause, and effect when writing their essay.

ANCOVAs with Cohen's d effect sizes and post hoc analyses were used to evaluate findings. Significant differences were found between posttest scores from the experimental to the control group ($F_{(1, 33)} = 15.90, p < .001$), with an moderately large effect size of .74. A large effect size was shown from students without LD between posttests scores between the two groups ($F_{(1, 15)} = 17.96, p = .001; d > 2.0$). Scores for the general education students in the control group showed a slight decrease, whereas the experimental group showed over a 50% improvement. The students with LD resulted in a medium to large effect size ($d = .69$). The 6-Trait Writing scores revealed significant differences between posttest scores of the experimental and controlled group ($F_{(1,33)} = 17.14, p < .001$), with a very large effect size of 1.44. Students in the control condition scored lower on the posttest when compared to the pretest by about 25%. Experimental and control students without LD displayed significant results ($F_{(1,15)} = 6.49, p = .022$), as did students with LD ($F_{(1, 15)} = 6.48, p = .022$). This resulted in a very large effect size for both students with and without LD ($d = 1.32$).

Overall, the QER and QEG boosted student performance on questions requiring written responses with little to no additional instruction time. The data showed an increase in scores among both students with LD and without LD. A moderately large effect size was noted between the experimental group and control group, and a large effect size was reported between the LD groups. According to Bulgren et al. (2009), the QER and QEG are easy-to-implement supports to increase essay writing for students with LD who participate in the mainstream

classroom. Some limitations include the small number of students and implementation of the study in a clinical rather than educational setting.

Ferretti et al. (2009) conducted research to determine if the *Argument from Consequences* strategy could improve students' argumentative writing abilities. The study participants included 96 typically achieving students and students with LD from four schools in the mid-Atlantic region. The fourth- and sixth-graders were randomly assigned and equally distributed to a general writing goal condition or the elaborated writing goal condition. Half of the students in each condition were identified as LD. The authors hypothesized that students who used elaborated goals would use better argumentative essays and strategies than students who used general writing goals.

Both groups were asked to take a position on the writing prompt "Should teachers give more out-of-class assignments?" Students in the elaborated goal group were also given seven additional goals that should be added to their writing (e.g., "You need to think of two or more reasons to back up your opinion") (Ferretti et al., 2009, p. 580). They were expected not only to justify their standpoint with reasons, but also to critique their standpoint. Data were collected regarding the students' ability to use persuasiveness, introduce the topic, present their standpoints and reasons, and present alternative standpoints and reasons. The use of counterarguments, rebuttals, conclusions, and nonfunctional statements was also assessed. The students had a total of 45 min to write their positions. ANOVAs and MANOVAs were used to analyze mean and standard deviation data.

Persuasiveness data indicated that goal condition ($F_{(1,88)} = 5.51, p = .021$), grade ($F_{(1,88)} = 9.28, p = .003$), and disability status ($F_{(1,88)} = 20.64, p < .001$) significantly affected the overall

persuasiveness of students' argumentative essays. Students in the elaborated condition wrote more persuasively than students in the general goal condition. Students without disabilities wrote more persuasively than students with LD, and sixth graders wrote more persuasively than fourth graders.

Argumentative structure data revealed significant effects when collecting data from the elaborate goal condition and their disability status ($F_{(10,79)} = 2.14, p = .03$) and a significant interaction between goal condition and grade ($F_{(1, 88)} = 15.30, p = .000$). Sixth-grade students in the elaborated goal had more alternative standpoints and rebuttals compared to those in the general goal group. They also produced more conclusions. However, the elaborated goal group had fewer justifications for alternate standpoint.

Ferretti et al. (2009) concluded students in sixth grade without LD who used elaborated goals wrote more persuasively than any other students. Students without disabilities in either group typically wrote more persuasively than students with a disability. Unfortunately, findings cannot be generalized because the researchers performed the study one time in one individual assessment. They did not explore any other settings, so they were unsure if students used what they learned on other writing essays.

Patel and Laud (2009) completed research on how three students with LD can add detail to their writing by using the Self-Regulated Strategy Development (SRSD) strategy. Kerry, Sabra, and Mali were seventh-graders from an urban school located in the northeast. Each received 55 min of classroom support three times a week for writing over a 5-week period in a special education resource room.

Six SRSD strategies were used: (a) develop background knowledge, (b) discuss it, (c) model it, (d) memorize it, (e) support it, and (f) perform independently. During the *Discuss it* stage students were taught the mnemonic www.what2how2 to help them remember that they need to include answers from seven questions:

1. Who are the main characters?
2. When does the story take place?
3. Where does the story take place?
4. What does the main character want to do?
5. What happens when he or she tries to do it?
6. How does the story end?
7. How does the main character feel?

These questions were answered on a graphic organizer about a story they read and analyzed together with a teacher.

Pretests and posttests were scored on word count, story grammar elements, number of images, and holistics (overall quality with regard to idea, organization, and conventions). Mali increased all areas with word count from 192 to 478, imagery from 4 to 16, grammar 9 to 17, and an overall increase from 11 to 13. Kerry also increased all scored areas: word length 256.5 to 350.0, imagery from 10 to 18, grammar 8 to 15, and holistic scores increasing from 11 to 13.5. Sabra, who started at below the level of the other two participants, increased her words from 277.5 to 470.5, one image to 13, and grammar 9 to 16. Her holistic score remained the same at 9 points from pretest to posttest.

The pre-post score increases indicate the intervention was successful. Patel and Laud (2009) recommended that teachers practice the strategy multiple times until it is automatic. They also recommended that the most time should be spent on modeling good word choice when describing pictures. To encourage the use of more details, students should be encouraged to highlight imagery words in the stories they read. Even though the intervention was successful, bias could be an issue because the teachers scored the work. Also, generalization was not measured, so it is unknown if students carried what they learned to other areas of writing.

Therrien, Hughes, Kapelski, and Mokhtari (2009) conducted a study to determine if the *Test-Taking Strategy* was an effective method to teach better writing strategies for students who have a learning disability in the area of writing. This study involved seventh- and eighth-graders from a rural school in southwest Ohio who had a writing disability and a writing goal on their IEP.

Students were randomly assigned to a treatment or control group and participated in eight 42-min instructional sessions to improve writing skills: 21 students were in the treatment group, 19 students were in the control group, and an additional 10 students without disabilities were in the comparison group of general education students. Students completed two essay prompts similar to those used for the statewide assessments prior and subsequent to the 2-week study. The treatment group received instruction using the *Essay Test-Taking Strategy* as the intervention. The *Essay Test-Taking Strategy* incorporates the ANSWER strategy that represents the six steps to improve writing: (a) Analyze action words in questions, (b) Notice requirements of questions, (c) Set up outline, (d) Work in detail, (e) Engineer your answer, and (f) Review

your answer. Students in the control group completed the same four writing prompts, but did not receive any extra instruction on improving their writing.

Two 5-point rubrics were developed to assess students' progress. The strategy-specific rubric documented if the ANSWER technique was used, and the general rubric measured ideas and content, organization, voice, word choice, sentence fluency, and conventions. The ANCOVA showed that the treatment group average of 2.729 was significantly higher than the control group average of 0.7421 ($F_{(1,37)} = 26.6, p < .0001$; $ES = 1.69$). Analysis of generalized rubric scores (idea, content, and organization) showed the treatment group had a statistically higher average of 4.190 compared to the control group average of 3.263 ($F_{(1,37)} = 5.54, p = .024$; $ES = .68$). This shows that the students who received the intervention had better writing in the area of generalization than the students in the control group. General education students also had higher mean scores (5.0) than students with disabilities who received the intervention (4.19).

The intervention was effective in improving the writing of the treatment group when compared to the control group. Students' writing in the treatment group had better organization, ideas, and content. Although improvement was noted, students in the treatment group with a learning disability still underperformed their peers without a disability. A limitation in the study was that the authors could not use actual high-stakes tests, but instead attempted to create high-stakes test conditions. Also, maintenance probes had planned to be used to make sure that the students continue to use the strategy after the intervention, but this could not be completed due to end-of-the-year activities.

Berninger and O'Malley May (2011) conducted a case study with two boys who had severe writing and comprehension problems. A.B. had just completed seventh grade, and C.D.

had just finished fifth grade. Both of these students were identified as non-responders to previous writing interventions.

Students participated in intervention sessions conducted by the same teacher: A.B. had 16 3-hr sessions and C.D. completed 14.5 3-hr instructional sessions. Each lesson consisted of warm-up activities, word-form reflection activities, and word/sentence play activities, activities for composing (planning, translating, reviewing/revising), and an independent writing assignment. *Writers' Workshop* was used, along with Unit I, II, and IV of *Teaching Students with Dyslexia and Dysgraphia* (Berninger & Wolf, 2009).

Six subtests of the *Weschler Individual Achievement Test-Second Edition* (WIAT-II; Psychological Corporation, 2001) were used as pre-post assessments: Spelling, Written Expression, Word Reading, Pseudoword Reading, and Reading Comprehension. Students also completed the Writing Fluency subtest of the *Woodcock-Johnson Tests of Academic Achievement-Third Edition* (WJ-III; Woodcock, Mather, & McGrew, 2001). Data were analyzed using standard scores on the pre-post assessments; only writing data are reported.

A.B. improved in all three areas related to writing. His posttest scores increased in the areas of Spelling (90 to 107), Written Expression (93 to 103), and Writing Fluency (109 to 111). A.B.'s scores improved by over 1 SD in handwriting and spelling and by .67 SD in composition, which placed him at a level of his same-age peers.

C.D.'s scores improved in Writing Fluency (65 to 68), but spelling scores decreased from 73 to 70, which the authors attributed to retrieval problems. Written Expression scores showed a pretest score of 93, but a posttest score was not available. Posttesting showed that C.D. made gains in morphological and syntactic awareness.

Berninger and O'Malley May (2011) concluded that in order to address the needs of treatment non-responders, an evidence-based LD identification is needed in order to use evidence-based instructional interventions. This helps target interventions for the specific writing and comprehension skills the student needs to develop. For example, if A.B.'s teachers could have understood his area of difficulty related to morphological awareness, they could have started teaching him these skills at a younger age. The authors asserted both response-to-intervention and an evidence-based diagnosis are needed to understand why a student is a non-responder to treatment interventions.

Berninger, Nagy, Tanimoto, Thompson, and Abbott (2015) conducted a case study to determine if computer instruction improved the writing skills of students diagnosed with LD in grades 4 through 9. The 28 male and seven female students participated in 18 2-hr lessons to improve listening, speaking, reading, and writing skills. The computer-based lessons were taken from *Letters in Motion* (LIM)TM, *Words in Motion* (WIM)TM, and *Minds in Motion* (MIM)TM created by the University of Washington. The students were placed in three groups:

(a) Dysgraphia = below 2/3 SD on two or more handwriting measures but did not show reading difficulties ($n = 13$); (b) Dyslexia = at least 1 SD below in Verbal Comprehension Index on two or more reading and spelling measures ($n = 17$); and (c) OWL LD = below 2/3 SD on two or more syntactic listening, reading comprehension, syntactic oral or written expression measures ($n = 5$). Students completed pre-post handwriting, spelling, and composing, which are described briefly in Table 2.

Table 2**Writing Assessments**

ASSESSMENT	DESCRIPTION
Handwriting	
<i>Alphabet 15 s</i> (Berninger et al., 2006)	Students write the alphabet in order from memory in cursive, handwriting, and keyboarding.
<i>Detailed Assessment of Speed of Handwriting (DASH) Best and Fast</i> (Barnett, Henderson, Scheib, & Schulz, 2007)	Students copy a sentence with all letters of the alphabet with their best handwriting or their fastest handwriting.
Spelling	
<i>Test of Orthographic Competence (TOC; Mather, Roberts, Hammill, & Allen, 2008)</i>	Students choose a letter in a set to fill in the blank to make the correctly spelled word.
Composing	
<i>Wechsler Individual Achievement Test-Third Edition (WIAT-3; Wechsler, 2009)</i>	Students combine two provided sentences into one well-written sentence that has all the ideas from the two individual sentences.
<i>Clinical Evaluation of Language Function Fourth Edition (CELF-4; Semel, Wiig, & Secord, 2003)</i>	The student makes oral sentences when provided with three words.

The authors used descriptive measures to analyze data from these assessments. Cohen's f^2 was used to express effect sizes ($f^2 = .02$ small, $f^2 = .15$ medium, and $f^2 = .35$ large effect sizes).

Overall, all posttest measures revealed that the computer-based intervention had a medium-to-large effect on improvement in writing for students who have a disability. The *Alphabet 15* had an average mean score of 2.27 (pretest) and improved to 3.26 (posttest) resulting in a medium effect size ($f^2 = .20$). The *DASH Copy Fast* also produced a medium effect size ($f^2 = .17$) for the increase in mean score of 5.66 at the pretest and mean score of 6.75 at the posttest. A large effect size ($f^2 = .40$) was reported for the *DASH Copy Best* mean pretest score increase from 8.00 to 9.31. When looking at the three disability areas, 12 of the 13 students in the dysgraphia group responded to the computer instruction in handwriting.

All four TOC subtests produced medium effect sizes. Letter Choice had a mean pretest score of 8.03 and posttest score of 9.00 ($f^2 = .27$). A medium effect size ($f^2 = .33$) was also shown on the TOC Sight Spelling with 8.13 and 9.26 as pre and posttest mean scores, respectively. The TOC Word Choice resulted in pretest score of 9.17, posttest score of 10.53 and $f^2 = .17$. The last TOC subtest was Word Scrambles, which resulted in an 8.78 pretest mean, a 9.65 posttest mean, and an effect size of $f^2 = .25$. Spelling was the focus for students with dyslexia, and results showed that 13 of the 17 students in this group were responders to at least one of the spelling measures. Although four students did not respond to the intervention, it was found that spelling is treatable even for students with dyslexic, but the area of spelling may take longer to resolve.

For the students in the OWL LD group, the study was conducted to determine if they could improve their syntax. The two tests used to assess written sentence syntax composing also revealed student gains. On the Sentence Combination subtest of the WIAT, students' pretest mean score of 94.18 increased at posttest to 99.59, which resulted in a medium effect size of $f^2 = .17$. The Sentence Formation subtest of the CELF-4 produced a pretest mean average score of 10.03 and a posttest mean of 11.67, with a medium effect size ($f^2 = .25$). Improvement was noted on their ability to increase their oral syntax, but written syntax did not show improvements.

These results demonstrated the effectiveness of a computer-based intervention for teaching writing skills. Berninger et al. (2015) concluded this study provides evidence that both word and syntax of language should be taught in the same lesson. However, they noted a few limitations with this case study. One issue was that because the lessons were conducted after the

participants attended a full day of school, students could have been fatigued. Also, study participants were limited to those whose parents had transportation. Another limitation was that the lessons were offered only once weekly over a 5-month period; more lessons could have produced larger effect sizes. Finally, future studies should ensure that students have the necessary keyboarding skills to participate in a computer-based intervention.

Tanimoto et al. (2015) completed a nearly identical case study using the same procedures but with 21 different fourth- through ninth-grade students with specific learning disabilities. The 14 males and seven females participated in 18 sessions over a 3-month period at the University of Washington. Eleven students were placed in Group A and received arrow cues on where to start when forming letters. Ten students were in Group B and received multiple ordered strokes with numbers and different colors with arrows to show full directional cues. Both groups of students completed lessons in HAWK™, which consisted of three lessons at their own pace (typically 1 hr) titled *Letters in Motion* (handwriting), *Words in Motion* (word spelling and reading learning), and *Minds in Motion* (syntax learning activities).

Many of the same pre-post tests used in the previous study to assess writing were also used in this study, although Group A and Group B completed different tests. In addition to the TOC to assess spelling, researchers also administered the WIAT-3 as pre-posttests. In contrast to the previous study, more tests were administered to assess students' pre-post composing skills. These composing assessments are presented in Table 3.

Table 3**Composing Assessments**

ASSESSMENT	DESCRIPTION
WIAT-3	Students combine two provided sentences into one well-written sentence that has all the ideas from the two individual sentences.
CELF-4	The student makes oral sentences when provided with three words.
<i>Test of Word Reading Efficiency</i> (TOWRE; Torgesen, Wagner, & Rashotte, 1999)	Students read words from a printed list with a 45 s time limit.
Writing Fluency subtest of the WJ-III	Students are given three words in which they need to use to create a short, simple sentence within 7 min.
<i>PAL II Sentence Sense Accuracy</i> (Berninger, 2007)	Students are shown three sentences and need to pick which sentence is real and meaningful (only given to Group B).

This study also employed Cohen's f^2 to analyze effect sizes. Table 4 shows the pretests and posttests means for Group A and Group B as well as the Cohen's f^2 , and effect size. All areas tested resulted in medium to very strong effect sizes showing an increase from pretest to posttest scores.

Table 4**Group Results Comparison**

GROUP	ASSESSMENT MEASURE	EFFECT SIZE	PRETEST MEAN SCORE	POSTTEST MEAN SCORE
A	<i>Alphabet 15 Manuscript</i>	.23 medium	7.20	9.20
	<i>Alphabet 15 Cursive</i>	2.2 very strong	0.89	2.89
	TOC Letter Choice	.31 medium	7.80	8.90
	TOWRE Phonemic	.68 strong	91.65	94.60
B	<i>Alphabet 15 Manuscript</i>	.67 strong	10.00	13.36
	<i>Alphabet 15 Cursive</i>	.94 strong	1.82	4.18
	DASH Copy Fast	1.17 very strong	6.82	8.45
	WIAT III Spelling	.54 strong	76.22	80.55
	TOC Letter Choice	.82 strong	8.03	8.55
	TOWRE Sight Word	.52 strong	85.91	92.54
	PAL Sentence Sense Accuracy	1.08 very strong	8.82	13.18
	WJ III Writing Fluency	1.22 very strong	81.64	88.27

In the area of handwriting, the colored visual cues given to Group B increased their writing skills, as demonstrated by their higher scores on all measures except for *Alphabet 15 Cursive*. The group, as a whole, all increased their reading and writing abilities in handwriting, word level reading, spelling, and syntax reading and writing skills. In the end, the authors also reported that the students who participated in this case study used what they learned on the computer to actual writing with pen and paper.

Manfred, McLaughlin, Derby, and Everson (2015) wanted to determine if the Cover, Copy, Compare (CCC) strategy would improve spelling and writing for students with specific learning disabilities. Three students were selected to participate in the 12-week study during the regular school year at a public school in the Pacific Northwest. One student was a 9-year-old girl in third grade, and the two boys in the study were 11 years old in the sixth grade.

The two dependent variables were the percent of spelling words spelled correctly on tests and the use of the same spelling words on their individual writing prompts. For this study, all received the intervention in a resource room. The materials used for this study included CCC practice sheets, data collection sheets, pre- and posttests from the general education curriculum, and student-generated free writing samples. Intervention consisted of CCC strategy training delivered in the resource room over the 12-week period of the study. Participants were taught how to use the CCC strategy steps: (a) look at the modeled word, (b) write the word while looking at it, (c) cover the modeled word, (d) write the word for memory, (e) uncover the modeled word, (f) compare the newly written word to the modeled word, and (g) repeat two more times for each word.

Baselines were conducted for 3 weeks for Student 1, and 2 weeks for Students 2 and 3. The intervention was conducted for 9 weeks for Student 1, and 8 weeks for Students 2 and 3, for a total of 12 weeks altogether. Baseline and posttest data included scores from grade-level spelling pretests given every Monday and posttests given every Friday as a part of the general education curriculum. Therefore, spelling pre-and posttest data were reported for both baseline and intervention phases.

Pretest data for Student 1 indicated she was able to spell 35-70% of her words correctly on the pretests, and this remained somewhat consistent at posttest with 45-70% correct words. After the intervention she could spell 80-100% of the words correctly on the posttests. When asked to complete a writing prompt using the spelling words in her own written work, she could correctly spell 60-85% of the words while in the general education setting.

Student 2 received spelling pretest scores of 46-50% and posttests scores of 62-69% during baseline. After the CCC was introduced, his pretests scores were between 55-68% and posttest scores were in the 93-97% range. His writing skills on the sample probes also increased, but the authors did not produce data for this variable.

Student 3's scores ranged from 31-35% for the pretest and 31-46% on posttests before the intervention was implemented. Subsequent to intervention, his pretest scores were in the 24-43% range and posttest scores were in the 62-65% range. Student 3 had more difficulties with spelling, which the researchers attributed to not taking his ADHD medication on a regular basis. Because he was not improving after the intervention, researchers reduced the number of words on his list, which resulted in increased posttest scores that ranged between 71-75%. His

writing samples decreased from the baseline data because he used more spelling words in his writing, but he spelled more words incorrectly.

Overall, the authors concluded the CCC method was effective in improving most participants' spelling and writing skills. Manfred et al. (2015) cited four limitations of their study. First, classroom teachers were to send CCC students to the resource room for intervention practice, but did not do so many times—for unknown reasons. Another limitation was the time frame in which the intervention took place. Specifically, the study was conducted during the same time as state testing, which took time away from the CCC resource time. The modification completed for Student 3 was an additional limitation because it created another variable by decreasing the word list by half.

Summary

The studies in this chapter explored the effectiveness of writing interventions for students with a learning disability. Table 5 summarizes the studies related to the effectiveness of each intervention with information regarding the research design, participants, procedure, and overall results.

Table 5**Summary of Chapter 2 Studies**

AUTHOR (DATE)	RESEARCH DESIGN	PARTICIPANTS/ SETTING	PROCEDURE	RESULTS
Chalk, Hagan-Burke, & Burke (2005)	Quantitative; descriptive research	15 tenth-grade students ranging in age from 15.3 to 17.4 with LD located in the southeast	8 probe conditions with five sessions of 20-25 min lessons from the <i>Self-Regulated Strategy Development Model</i>	Students benefited from the approach to help them with strategies in brainstorming, semantic webbing, setting goals, and revision with majority of growth in word production.
Walker, Shippen, Alberto, Houchins, & Cihak (2005)	Quantitative; single-subject method	3 students with LD ages 14-16 attending a public high school in southeast U.S.	Pretest, posttest, writing probes at weeks 2, 4, and 6 after completing 50 lessons of the <i>Expressive Writing Program</i>	The number of correct word sequences per instructional session increased in an upward pattern.
Bui, Schumaker, & Deshler (2006)	Quantitative; quasi-experimental comparison-group design	113 fifth-graders (14 with LD) from two low-performing public elementary schools in the midwest	Pretest, posttest, and writing samples with intervention instruction from the <i>Demand Writing Instruction Model</i> received once a day for 3 months	Using different writing interventions can create statistically significant gains in writing performance of students with LD in inclusive language arts class.
Bulgren, Marquis, Lenz, Schumaker, & Deshler (2009)	Quantitative; causal-comparative research	36 students with and without LD in grades 9-12 at an inner-city school	Random assignment to experimental or control conditions with two 89 min session from <i>Questions Exploration Routine</i> given 5 days apart	Significant differences were reported for the experimental condition group, with more variation in performance for students with LD
Ferretti, Lewis, & Andrews-Weckerly (2009)	Quantitative; causal-comparative research	93 students in fourth and sixth grade with and without LD from four mid-Atlantic schools	Writing prompts with scoring guide from 0-7 taken from <i>Argument from Consequences</i> strategy	Explicit genre-specific goals positively impacted the quality of students' written arguments.
Patel & Laud (2009)	Quantitative; descriptive research	3 students in seventh-grade located in the northeast U.S. at an urban independent school	6 stages from <i>Self-Regulated Strategy Development Model</i> along with pretest-and posttest samples	2 of the 3 students made vast improvements with their writing related to the number of words, grammar, and holistic rating.

Table 5 (continued)

AUTHOR (DATE)	RESEARCH DESIGN	PARTICIPANTS/ SETTING	PROCEDURE	RESULTS
Therrien, Hughes, Kapelski, & Mokhtari (2009)	Quantitative; two-level (treatment or control) single- factor pre/post experimental design	19 seventh-graders and 23 eighth-graders with LD from a rural school district in southwest Ohio	Pretest, posttest, and student writing samples after receiving a writing prompt and intervention from <i>Essay Test Taking Strategy</i>	The treatment group improved when compared to the control group. The strategy improved ideas/content and organization.
Berninger & O'Malley May (2011)	Quantitative; descriptive research	2 boys; one who just finished fifth grade and the other finished seventh grade	Pretests, posttests, and sixteen 3-hr tutoring sessions using <i>Writer's Workshop</i> and <i>Teaching Students with Dyslexia and Dysgraphia</i>	Both students displayed gains in dysgraphia and dyslexia goals.
Berninger, Nagy, Tanimoto, Thompson, & Abbott (2015)	Quantitative; correlational research	35 fourth to ninth- graders diagnosed with SLD with dysgraphia, dyslexia, and oral and written language disability	Eighteen 2-hr lessons, pretests, and posttests with various activities from <i>Letters in Motion</i> , <i>Words in Motion</i> , and <i>Minds in Motion</i> .	Individual students improved in the skill of impairment associated with their diagnosis. Computers were effective for Tier 3 writing instruction.
Manfred, McLaughlin, Derby, & Everson (2015)	Quantitative; single-subject research	Two 11-year old boys and one girl with spelling deficits in the Pacific Northwest	Pretests, posttests, and writing sample probes; teaching the <i>Cover</i> , <i>Copy</i> , <i>Compare (CCC)</i> technique to improve spelling	CCC is an effective way to improve student spelling success, which improves the overall writing process.
Tanimoto, Thompson, Berninger, Nagy, & Abbott (2015)	Quantitative- quasi- experimental design	11 students in grades 4-9 who had SLD in writing and 10 students without a disability	Three sets of lessons from <i>Letters in Motion</i> , <i>Words in Motion</i> , and <i>Minds in Motion</i> at their own pace	Computer lessons related to the specific activity correlated with the specific posttest scores.

Chapter 3: Conclusions and Recommendations

Writing is one of the most difficult academic areas for students with a learning disability (LD). My primary purpose in investigating this topic was to discover effective writing interventions that improve students' writing ability so that I can implement them in my classroom. Relevant historical and theoretical information regarding the writing performance of students with LD was provided in Chapter 1. I reviewed 11 studies in Chapter 2 that evaluated the effects of various interventions on the writing skills of students with writing disabilities. In this chapter, I discuss the findings of the 11 studies and provide recommendations for future research and my own teaching practice.

Conclusions

All 11 studies showed an increase in achievement in the area of writing for students who have a learning disability in writing. Two of the 11 studies used the same intervention (Berninger et al., 2015), and the other nine used different interventions to improve writing outcomes. The studies addressed different aspects of student writing such as adding detail, improving testing performance, increasing spelling, brainstorming, editing, syntax, length, and technology use.

Planning is an important aspect of writing that is troublesome for students with LD. Two studies demonstrated students' ability to plan improved using *Demand Writing Instruction Model* (Bui et al. 2006) and *SRSD* (Patel & Laud, 2009). Planning can involve brainstorming, which was investigated in two studies. Chalk et al. (2005) and Patel and Laud (2009) used the SRSD model to teach brainstorming and improve students' writing outcomes

The ability to produce relevant text from a topic is another important element of effective writing. The interventions that made the most improvements in this area included both of the SRSD interventions (Chalk et al., 2005; Patel & Laud, 2009), the *Expressive Writing Program* (Walker et al., 2005), and the *Questions Exploration Routine* (Bulgren et al., 2009). These studies also increased the students' ability to write lengthier essays.

Text revision/editing incorporates the areas of spelling, editing, and handwriting. Spelling outcomes were improved using the *Cover, Copy, Compare* model (Manfred et al., 2015), *Teaching Students with Dyslexia & Dysgraphia* (Berninger & O'Malley May 2011), and both of the interventions that incorporated technology (Berninger et al., 2015; Tanimoto et al., 2015). Two interventions improved editing skills: SRSD (Chalk et al., 2015) and the *Demand Writing Instruction Model* (DWIM; Bui et al., 2006). Handwriting was improved using *Letters in Motion*, *Words in Motion*, and *Minds in Motion*, and students spent less time trying to determine what they wanted to write (Berninger et al., 2015).

Another area of the writing process in which students with LD struggle is motivation. Students with LD feel their writing is not of high quality, and it is difficult for them. Bui et al. (2006) used the DWIM intervention to increase students' self-efficacy. The SRSD model was developed in part to increase students' belief in their ability to succeed in writing, and both SRSD studies were successful in this regard (Chalk et al., 2005; Patel & Laud, 2009).

Technology was integrated into two studies by the same authors (Berninger et al., 2015; Tanimoto et al., 2015). These studies used three computer-based interventions: *Letters in Motion* (handwriting), *Words in Motion* (word spelling and reading learning), and *Minds in Motion* (syntax learning activities). The students were interested in the programs and were attentive and

focused. The computer-based intervention resulted in positive gains for students with LD in the area of writing and reading.

Data were collected through pretest and posttests for all 11 studies. Some authors used standardized tests, whereas others used writing probes. The studies that were conducted over a longer period of time produced stronger effect sizes (Berninger et al. 2015; Bui et al. 2006; Manfred et al., 2015; Walker et al., 2005).

Some studies contained research groups with disabled students and nondisabled students (Bui et al., 2006; Bulgren et al., 2009; Ferretti et al., 2009). Students with disabilities showed significant gains in writing (Berninger et al., 2015; Bulgren et al., 2009; Patel & Laud, 2009), whereas other studies resulted in minimal improvements (Berninger & O'Malley May, 2011). The groups containing nondisabled students always outscored the students with a disability, even when the students with disabilities made gains. Nonetheless, these studies demonstrate how interventions can be used in the inclusive classroom without having the special education students feel different.

Students with LD can improve their writing abilities if an intervention is conducted efficiently over an extended amount of time. Students need to believe in themselves and they need supportive teachers to help them with the difficult struggle of writing. The findings in these studies demonstrate that a variety of interventions can be used to improve students' writing skills.

Recommendations for the Future Research

One of the major recommendations for future research is to evaluate more interventions that incorporate technology. Students are more attentive and motivated to complete academic tasks when technology is involved.

It was difficult to locate studies conducted with high school and middle school students because most writing studies focused on elementary students. I expected to find many more studies at the upper grade levels. Researchers should conduct studies in the older grade levels because many of them continue to struggle with writing.

Another recommendation is to conduct studies with students who have different disabilities or comorbid disabilities. Students who have Attention Deficit Hyperactivity Disorder (ADHD) and other disabling conditions may not respond the same to interventions as students who have LD without such comorbid disabilities.

The amount of time spent using the interventions should be continued for a longer amount of time in order for students to derive the greatest benefits. Most of the studies I read about included this in their limitations. I would like to see researchers conduct their studies for a longer time to obtain a better understanding of how the interventions contributed to improved writing skills.

A few studies examined maintenance of skills, but only after a few weeks. I think it would be beneficial to see how students perform after many months or a year. It is also important to determine if students can generalize the use of skills to different environments and content areas. Students need to be able to not only write proficiently during writing instruction, but also when writing in everyday life. This will carry over to their adult lives.

Implications for Practice

I agree with the findings regarding the need for students to generalize and use the information they learned in different environments and different academic areas. This is an issue with my students. I use the University of Kansas Strategies for Writing Series (*Sentence Writing Strategy (Fundamentals)*) (Schumacher & Sheldon, 1999a) and *Sentence Writing Strategy (Proficiency)* (Schumacher & Sheldon, 1999b) in my classroom. The students do really well when working with the specific lessons, but do not use the strategies when completing their own writing, a writing prompt, or writing for different academic areas (e.g., science and social).

These research findings also have implications for me regarding the amount of time needed for interventions to be successful. I always find this an area of difficulty for several reasons. First, I see students who have writing and reading difficulties at the same time for 51 min a day. This is a very short amount of time to try and teach both reading and writing. Reading involves many different areas of comprehension and fluency that require a great deal of time, and a great deal of time is also required for writing skills such as spelling, conventions, brainstorming, planning, editing, and organizing.

Since there seems to be more of an emphasis on reading, I have often wondered if the intense focus on reading results in a diminished focus on writing. However, it was interesting to learn that in a few studies, the interventions designed to improve writing also improved their reading ability. This is important for my practice because when I spend time during class I know I am also improving their reading.

Spelling is an area in which most of my students struggle. I really enjoyed reading about the study that found the cover, copy, compare (CCC) strategy improved writing to the 80-100%

accuracy level. I feel this technique is something I can easily incorporate into my classroom to help boost spelling.

The Berninger and O'Malley May (2011) study discussed students who were non-responders. This was especially important for me because sometimes the interventions I use do not always work. After reading this study I realized that I may not be using interventions that are related to the students' specific needs in the area of writing. I need to research further the assessments that will allow me to better understand each student's writing needs. This will enable me to target interventions more precisely.

Patel and Laud's (2009) study researched adding detail to writing, which is also an area in which my students struggle. They do not have a large vocabulary and have difficulty thinking of colorful words to use when writing. They also struggle with brainstorming their ideas, so most of their writing is simplistic with no rich or vibrant words. Having students read a story and add their own inventive writing may be the idea I need to use when practicing how to add colorful elements to writing.

Summary

A variety of interventions were effective in improving the writing skills of students who have a learning disability in the area of writing. One of the most important aspects of choosing an intervention is making sure that it directly correlates with the student's need and that it is implemented over a long period of time. This shows that even students with a learning disability in writing can make gains and improvements over time in the areas of writing.

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